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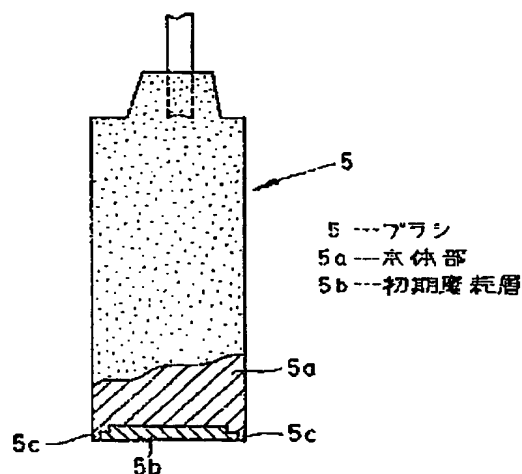
(74)代理人 弁理士 志賀 富士弥 (外3名)

(54)【考案の名称】 燃料ポンプ

(57)【要約】

【目的】 組立後の駆動開始時にブラシ5とコミュテータとの接触を早期に安定した面接触状態とし、流量検査の精度を高める。

【構成】 コミュテータと接触するブラシ5が、本体部5aと先端の初期摩耗層5bとの2層構造となっている。本体部5aは、銅とカーボンを40:60の割合で混合した材料からなる。初期摩耗層5bは、摩耗速度が比較的早くなるように、カーボンにバインダを配合した材料にて形成されている。



JAPANESE

[JP,06-025592,U]

CLAIMS DETAILED DESCRIPTION TECHNICAL FIELD PRIOR ART EFFECT OF THE
INVENTION TECHNICAL PROBLEM MEANS OPERATION EXAMPLE DESCRIPTION OF
DRAWINGS DRAWINGS

[Translation done.]

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CLAIMS

[Utility model registration claim]

[Claim 1] The fuel pump characterized by preparing the initial wearing course which becomes only the apical surface from the comparatively early quality of the material of the wear rate which made carbon the subject while the brush arranged in the casing side formed the above-mentioned brush with the material which mixed copper and carbon in the fuel pump which comes to build the DC motor which ****s to the commutator of an armature edge.

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DETAILED DESCRIPTION

[Detailed explanation of a design]

[0001]

[Industrial Application]

This design is related with improvement of the electromotive fuel pump used for an automobile engine etc.

[0002]

[Description of the Prior Art]

For example, since the fuel pump of an automobile engine is driven with a mounted battery, the thing of the form which built in the DC motor is used. As an example, the DC motor which the pump section which used the turbine blade for the pars basilaris ossis occipitalis of casing which makes approximate circle tubed is constituted, and drives a turbine blade in the casing center section consists of turbine type fuel pumps which built in the DC motor. Profile composition of this DC motor is carried out from the armature connected with the turbine blade, the magnet arranged at casing inner skin, and the brush of the couple which ****s to the commutator of an armature edge.

In addition, this kind of fuel pump is used in the state where it sank into fuel, and serves as the form where each part of a DC motor was also exposed into fuel.

[0003]

[Problem(s) to be Solved by the Device]

The above motor-spirit pumps are in the inclination for much more miniaturization to be required in recent years, and in connection with it, in order to secure the required amount of discharge flows, they need to accelerate a pump rotational frequency, i.e., a motor rotational frequency. Therefore, while the alloy which the commutator and the brush became what thought the abrasion resistance at the time of high-speed rotation as important, for example, blended about 0.7% of silver with copper as a material of a commutator is used, what mixed copper and carbon at about 40:60 rate as a material of a brush is used.

[0004]

However, when the contact state of the brush and commutator immediately after pump assembly is unstable, a pump is driven separately and it conducts flow rate inspection in the combination which thought abrasion resistance as important in this way, it is easy to carry out a misjudgment law.

Moreover, although the so-called aging process which drives a pump was established in advance of inspection until flow characteristics were stabilized in order to prevent such an incorrect judging, it also took several hours, by the time flow characteristics were stabilized, and there was a fault that working capacity was very bad.

[0005]

[Means for Solving the Problem]

Then, this design is characterized by preparing the initial wearing course which becomes only the apical surface from the comparatively early quality of the material of the wear rate which made carbon the subject while the brush arranged in the casing side forms the above-mentioned brush with the material

which mixed copper and carbon in the fuel pump which comes to build the DC motor which ****s to the commutator of an armature edge.

[0006]

[Function]

If the drive of a pump is started immediately after pump assembly, it is begun to wear out an initial wearing course with an early wear rate by the slide contact to a commutator at an early stage. Therefore, the field contact to a brush nose of cam and a commutator is secured at an early stage, and a pump discharge flow rate is stable.

[0007]

[Example]

** which explains one example of this design hereafter based on a drawing.

[0008]

While drawing 2 shows the DC-motor portion of the fuel pump concerning this design and the armature 2 is supported by the shaft 1 free [rotation], the commutator supporter 3 of an approximate circle tabular is formed in this armature 2 edge, and the commutator 4 is arranged in the end face. In accordance with the parting line of a radial, it is divided into two or more segments, and this commutator 4 is formed in disc-like [flat as a whole]. The alloy which was excellent in the abrasion resistance which blended about 0.7% of silver with copper, for example as a material of this commutator 4 is used.

[0009]

The brush 5 of the couple arranged in parallel with a shaft 1 is in slide contact with the front face of the above-mentioned commutator 4. This brush 5 is always energized towards the commutator 4 with the spring which it is held at casing which is not illustrated and is not illustrated.

[0010]

Drawing 1 expands and shows the above-mentioned brush 5, and this brush 5 has the two-layer structure of this soma 5a and initial wearing-course 5b thinly formed in the apical surface, and is formed in the prismatic as a whole. This above-mentioned soma 5a is compressed and fabricated in the rubber press, after blending some binder with this using the material which mixed copper and carbon at a rate of 40:60. Moreover, initial wearing-course 5b mixes a binder at a rate of 1:1 to carbon, is compressed and has fabricated it in the rubber press so that a wear rate may become early as compared with this soma 5a. And it calcinates to both one in the state where it combined like illustration of this soma 5a and initial wearing-course 5b, and has unified mutually. The thickness of the above-mentioned initial wearing-course 5b is about 0.5mm. Moreover, wall 5c which makes a part of this soma 5a has surrounded the periphery of brush 5 apical surface, and it serves as the form where initial wearing-course 5b fitted in in the crevice surrounded by this wall 5c.

[0011]

Drawing 3 is what measured and showed the compound (sample 1) of the copper and carbon which constitute this soma 5a, and the wear rate of the carbon (sample 2) which constitutes initial wearing-course 5b, and shows the abrasion loss when carrying out a continuation drive in a gasoline for 200 hours. The wear rate of initial wearing-course 5b is early compared with the quality of the material of this soma 5a so that clearly [this drawing].

[0012]

Therefore, according to the composition of the above-mentioned example, if the drive of a pump is started after pump assembly, it begins to wear out at an early stage, the point of a brush 5, i.e., initial wearing-course 5b, which ****s to a commutator 4, and will be in the field contact state by which the brush 5 and the commutator 4 were stabilized. Therefore, while it becomes that by which had by short-time aging and the amount of discharge flows was stabilized and each flow rate inspection can carry out with a sufficient precision, the time which aging takes can be shortened sharply.

[0013]

Moreover, since this soma 5a excellent in abrasion resistance comes to **** to a commutator 4 after preparing the above-mentioned initial wearing-course 5b in the shape of a film and wearing this out

completely, the endurance as the brush 5 whole is not spoiled at all.

[0014]

Moreover, with the above-mentioned composition, if a brush 5 is made into two-layer structure as mentioned above, although ablation by both plane of composition will pose a problem, since wall 5c at this nose of cam of soma 5a has surrounded the circumference of initial wearing-course 5b and this soma 5a and initial wearing-course 5b are being engaged physically, ablation and defluxion of initial wearing-course 5b can prevent certainly.

[0015]

[Effect of the Device]

When a drive start is carried out after pump assembly in the fuel pump concerning this design by the above explanation so that clearly, it becomes the field contact by which the initial wearing course at the nose of cam of a brush carried out the wear start immediately, and contact to a brush and a commutator was stabilized. Therefore, while the time which aging takes can be shortened and working efficiency improves, the incorrect judging in flow rate inspection can be prevented.

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TECHNICAL FIELD

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PRIOR ART

[Description of the Prior Art]

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In addition, this kind of fuel pump is used in the state where it sank into fuel, and serves as the form where each part of a DC motor was also exposed into fuel.

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EFFECT OF THE INVENTION

[Effect of the Device]

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Device]

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MEANS

[Means for Solving the Problem]

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OPERATION

[Function]

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EXAMPLE

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The cross section showing the brush of the fuel pump concerning this design.

[Drawing 2] The plan showing the motor portion of the fuel pump concerning this design.

[Drawing 3] The property view measuring and showing the wear rate of this soma of a brush, and an initial wearing course.

[Description of Notations]

2 -- Armature

4 -- Commutator

5 -- Brush

5a -- This soma

5b -- Initial wearing course

[Translation done.]

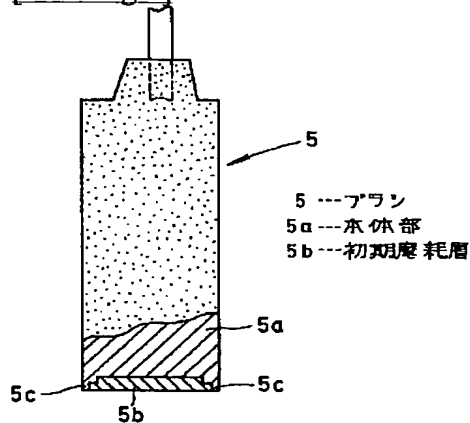
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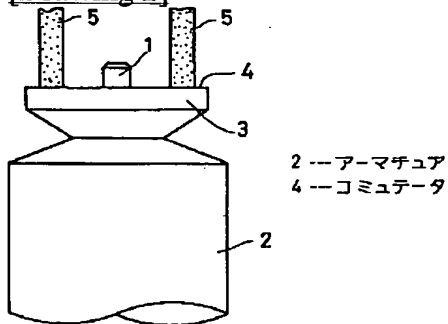
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DRAWINGS

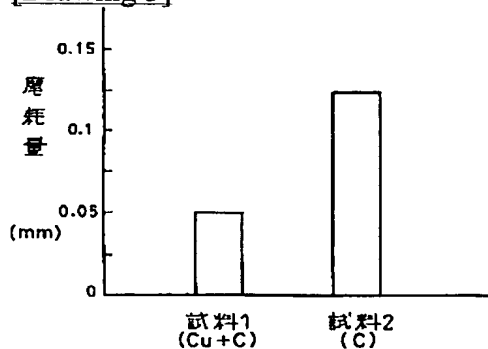
[Drawing 1]



[Drawing 2]



[Drawing 3]



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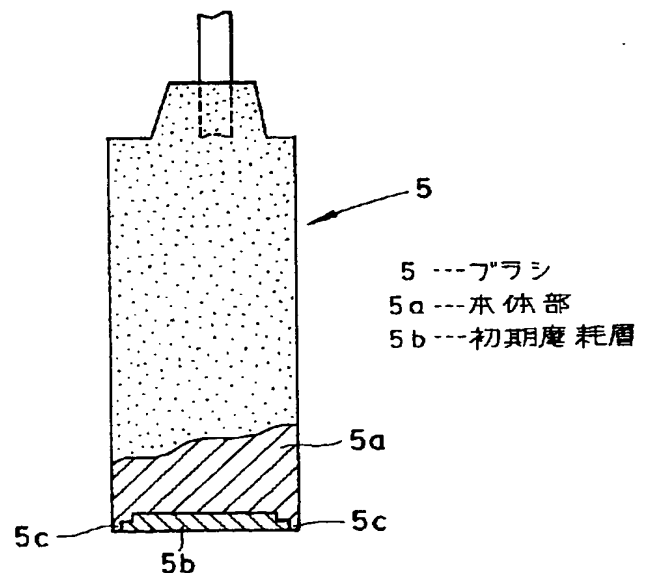
(74)代理人 弁理士 志賀 富士弥 (外3名)

(54)【考案の名称】 燃料ポンプ

(57)【要約】

【目的】 組立後の駆動開始時にブラシ5とコミュテータとの接触を早期に安定した面接触状態とし、流量検査の精度を高める。

【構成】 コミュテータと接触するブラシ5が、本体部5aと先端の初期摩耗層5bとの2層構造となっている。本体部5aは、銅とカーボンとを40:60の割合で混合した材料からなる。初期摩耗層5bは、摩耗速度が比較的早くなるように、カーボンにバインダを配合した材料にて形成されている。



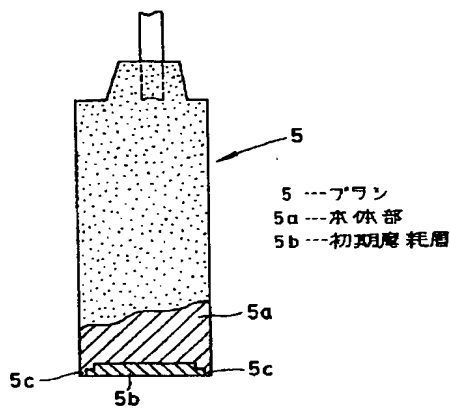
【実用新案登録請求の範囲】

【請求項1】 ケーシング側に配設したブラシがアーマチュア端部のコミュテータに摺接する直流モータを内蔵してなる燃料ポンプにおいて、上記ブラシを、銅とカーボンを混合した材料にて形成するとともに、その先端面のみに、カーボンを主体とした摩耗速度の比較的早い材質からなる初期摩耗層を設けたことを特徴とする燃料ポンプ。

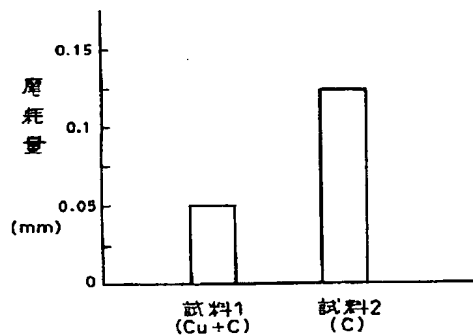
【図面の簡単な説明】

【図1】 この考案に係る燃料ポンプのブラシを示す断面図。

【図1】



【図3】



2

【図2】 この考案に係る燃料ポンプのモータ部分を示す平面図。

【図3】 ブラシの本体部と初期摩耗層との摩耗速度を比較して示す特性図。

【符号の説明】

2...アーマチュア

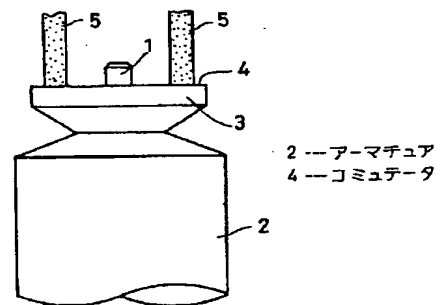
4...コミュテータ

5...ブラシ

5a...本体部

5b...初期摩耗層

【図2】



【考案の詳細な説明】**【0001】****【産業上の利用分野】**

この考案は、自動車用内燃機関等に用いられる電動式燃料ポンプの改良に関する。

【0002】**【従来の技術】**

例えば自動車用内燃機関の燃料ポンプは、車載のバッテリーで駆動されるので、直流モータを内蔵した形式のものが用いられる。一例として、直流モータを内蔵したタービン型燃料ポンプでは、略円筒状をなすケーシングの底部にタービンベーンを用いたポンプ部が構成され、かつケーシング中央部に、タービンベーンを駆動する直流モータが構成されている。この直流モータは、タービンベーンに連結されたアーマチュアと、ケーシング内周面に配置されたマグネットと、アーマチュア端部のコミュテータに摺接する一対のブラシとから大略構成されている。尚、この種の燃料ポンプは燃料中に没した状態で使用され、直流モータ各部も燃料中に露出した形となる。

【0003】**【考案が解決しようとする課題】**

上記のような内燃機関用燃料ポンプは、近年、一層の小型化が要求される傾向にあり、それに伴って、必要な吐出流量を確保するためにポンプ回転数つまりモータ回転数を高速化する必要がある。従ってコミュテータやブラシは高速回転時の耐摩耗性を重視したものとなり、例えばコミュテータの材料として銅に0.7%程度の銀を配合した合金が用いられるとともに、ブラシの材料として銅とカーボンとを40:60程度の割合で混合したものが用いられている。

【0004】

しかしながら、このように耐摩耗性を重視した組み合わせでは、ポンプ組立直後におけるブラシとコミュテータとの接触状態が不安定であり、個々にポンプを駆動して流量検査を行う場合に、誤判定し易い。また、このような誤判定を防止するために、検査に先立って、流量特性が安定するまでポンプを駆動する所謂エ

ーシング工程が設けられているが、流量特性が安定するまでに数時間も掛かり、作業能率が非常に悪い、という欠点があった。

【0005】

【課題を解決するための手段】

そこで、この考案は、ケーシング側に配設したブラシがアーマチュア端部のコミュテータに摺接する直流モータを内蔵してなる燃料ポンプにおいて、上記ブラシを、銅とカーボンとを混合した材料にて形成するとともに、その先端面のみに、カーボンを主体とした摩耗速度の比較的早い材質からなる初期摩耗層を設けたことを特徴としている。

【0006】

【作用】

ポンプ組立直後にポンプの駆動を開始すると、摩耗速度の早い初期摩耗層がコミュテータとの摺接によって早期に摩耗し始める。そのため、ブラシ先端とコミュテータとの面接触が早期に確保され、ポンプ吐出流量が安定化する。

【0007】

【実施例】

以下、この考案の一実施例を図面に基づいて説明する。

【0008】

図2は、この考案に係る燃料ポンプの直流モータ部分を示すもので、軸1にアーマチュア2が回転自在に支持されているとともに、該アーマチュア2端部に略円板状のコミュテータ支持部3が形成され、その端面にコミュテータ4が配設されている。このコミュテータ4は、放射状の分割線に沿って複数のセグメントに分割されており、かつ全体として平坦な円板状に形成されている。このコミュテータ4の材料としては、例えば銅に0.7%程度の銀を配合した耐摩耗性に優れた合金が用いられる。

【0009】

上記コミュテータ4の表面には、軸1と平行に配置された一対のブラシ5が摺接している。このブラシ5は、図示せぬケーシングに保持されており、かつ図示せぬスプリングによって常時コミュテータ4へ向けて付勢されている。

【0010】

図1は、上記ブラシ5を拡大して示すもので、このブラシ5は、本体部5aと、先端面に薄く形成された初期摩耗層5bとの2層構造を有し、全体として角柱状に形成されている。上記本体部5aは、銅とカーボンとを40:60の割合で混合した材料を用い、これに若干のバインダを配合した上で、ラバープレスにて圧縮、成形してある。また初期摩耗層5bは、本体部5aに比較して摩耗速度が早いものとなるように、カーボンにバインダを1:1の割合で混合し、ラバープレスにて圧縮、成形してある。そして、本体部5aと初期摩耗層5bとを図示のように組み合わせた状態にて両者一体に焼成し、互いに一体化してある。上記初期摩耗層5bの厚さは、例えば0.5mm程度である。また、ブラシ5先端面の周縁は、本体部5aの一部をなす壁部5cが囲んでおり、該壁部5cに囲まれた凹部内に初期摩耗層5bが嵌合した形となっている。

【0011】

図3は、本体部5aを構成する銅とカーボンとの配合物（試料1）と、初期摩耗層5bを構成するカーボン（試料2）の摩耗速度を比較して示したもので、ガソリン中で200時間連続駆動したときの摩耗量を示している。この図に明らかに、初期摩耗層5bの摩耗速度は本体部5aの材質に比べて早い。

【0012】

従って上記実施例の構成によれば、ポンプ組立後にポンプの駆動を開始すると、コミュータ4に摺接するブラシ5の先端部つまり初期摩耗層5bが早期に摩耗し始め、ブラシ5とコミュータ4とが安定した面接触状態となる。そのため、短時間のエージングでもって吐出流量が安定したものとなり、個々の流量検査が精度良く行えるとともに、エージングに要する時間を大幅に短縮できる。

【0013】

また上記初期摩耗層5bは薄い層状に設けられており、これが完全に摩耗した後は耐摩耗性に優れた本体部5aがコミュータ4に摺接するようになるので、ブラシ5全体としての耐久性は何ら損なわれない。

【0014】

また上記のようにブラシ5を2層構造とすると、両者の接合面での剥離が問題

となるが、上記構成では本体部5 a先端の壁部5 cが初期摩耗層5 bの周囲を囲んでおり、本体部5 aと初期摩耗層5 bとが物理的に係合しているため、初期摩耗層5 bの剥離や脱落が確実に防止できる。

【0015】

【考案の効果】

以上の説明で明らかなように、この考案に係る燃料ポンプにおいては、ポンプ組立後に駆動開始した際に、ブラシ先端の初期摩耗層が直ちに摩耗開始してブラシとコミュテータとの接触が安定した面接触となる。従って、エージングに要する時間を短縮でき、作業効率が向上するとともに、流量検査における誤判定を防止できる。